
INSPECTION PROCEDURE 88200 APPENDIX I

INSPECTION OF VENTILATION AND CONFINEMENT SYSTEMS AT FUEL CYCLE FACILITIES

Effective Date: May 28, 2025

88200.I-01 INSPECTION OBJECTIVES

- 01.01 To determine if safety-significant ventilation and confinement system work is being performed in accordance with regulatory requirements, the licensing basis, specifications, drawings, and work procedures.
- 01.02 To determine if the applicant/licensee's system for preparing, reviewing, and maintaining records relative to safety-significant ventilation and confinement system activities reflects work accomplishment consistent with specifications and procedures.
- 01.03 To determine if the as-built condition of safety-significant ventilation and confinement systems meets the specified design requirements, specifications, and drawings.
- 01.04 To determine if the implementation of the management measures related to work activities for safety-significant ventilation and confinement systems associated with items relied-on for safety (IROFS) is effective and to verify that deviations from requirements are appropriately resolved.

88200.I-02 INSPECTION REQUIREMENTS

- 02.01 For the safety-significant items and services (SSIS) selected for inspection of ventilation and confinement systems, determine whether procedures exist in the following areas, are compatible with the management measures program for IROFS, and prescribe adequate methods to meet the licensing basis and construction specifications, where applicable:
 - a. receipt inspection
 - b. storage and handling
 - c. fit-up and alignment
 - d. installation activities
 - e. as-built equipment
 - f. configuration management
- 02.02 Determine whether the applicant/licensee has an established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements, as applicable in their licensing basis, in the area of ventilation and confinement system activities, and for ensuring that examination, inspection, and if required, test personnel associated with performing tests and inspections of safety-significant activities are qualified and/or certified to perform their assigned work.

- 02.03 Ascertain whether the following safety-significant ventilation and confinement system activities, as required by licensing commitments and applicable construction codes, are being controlled and accomplished in accordance with the requirements of the documents reviewed in 02.01, above:
- a. receipt inspection
 - b. storage and handling
 - c. fit-up and alignment.
 - d. installation activities
 - e. as-built equipment
 - f. configuration management
- 02.04 Review the documentation generated for the safety-significant ventilation and confinement system activities, as required by the licensing basis. Determine whether the applicant/licensee/contractor system for documenting safety-significant work is functioning in accordance with requirements. Records should be complete, reviewed by quality control, engineering personnel, or designee, as required, and readily retrievable.
- a. receipt inspection and material certification
 - b. installation inspection
 - c. nonconformance/deviation record(s)
 - d. training/qualification records of craft, and quality inspection personnel (as required)
 - e. configuration management records

88200.I-03 INSPECTION GUIDANCE

General Guidance

Inspectors should review the facility description in the integrated safety analysis, integrated safety analysis summary, or equivalent and be familiar with the SSIS being constructed at the site. The purpose of these as-built inspections is to verify that the assumptions and critical attributes reviewed during the licensing review process remain valid; the design was appropriately translated to construction specifications; the licensee/applicant constructed the facility in accordance with these specifications; and any modifications performed complies with the licensee's configuration management program and does not impact any NRC licensing decisions.

Inspectors should also be familiar with the licensee's management measures and/or quality assurance program (QAP), if applicable, and the licensing basis associated with these measures. It is not the objective of this inspection procedure (IP) to verify the adequacy of the applicant/licensee's management measures program, but inspectors should be prepared to identify potential gaps in the implementation of management measures for future inspections. Inspectors should complete this appendix by inspecting the attributes listed in this appendix for as-built ventilation and confinement system work with a focus on SSIS, such as IROFS, or regulatory requirements, as applicable.

Inspectors should contact the applicant/licensee prior to the onsite inspection to help determine what samples are to be inspected. Observation during in progress activities, like construction, installation, and testing, is desirable but not required. If necessary, inspectors may select completed systems for inspection. Inspectors should not attempt to inspect all available samples

but may expand if significant concerns with the applicant/licensee's control of installation/construction arise in this functional area.

Inspectors should collect applicant/licensee procedures, specifications, and work completion records in advance. If unable to review these documents in advance of the onsite inspection, then the licensee should be notified that these documents, and any other relevant documents, should be available when the inspector(s) arrives at the site.

Inspectors should choose one or more safety-significant ventilation and confinement systems and review the areas listed in Inspection Requirements 02.01 through 02.04 to the extent practical and may use their judgment in determining which areas to concentrate on if time is limited.

03.01 Inspection Requirement 02.01

- a. Review construction specifications related to safety-significant ventilation and confinement systems and ascertain whether the specified technical requirements conform to the commitments contained in the licensing basis.
- b. Review ventilation and confinement system procedures and as applicable, verify that they specify provisions for adequate onsite engineering direction, are appropriate and adequate related to procurement and use of materials, specify adequate control of hold points, and provide adequate controls for design changes and incorporation of design changes into as-built drawings.
- c. Determine if appropriate and adequate procedures in the following areas are compatible with the management measures program, and prescribe adequate methods to meet the construction specifications, where applicable:
 1. receipt inspection
 2. storage and handling
 3. fit-up and alignment
 4. installation activities
 5. as-built equipment
 6. configuration management
- d. For the procedure review, consider the following attributes:
 1. Controls to ensure that the type and classification of ventilation and confinement systems comply with approved drawings and/or specifications and meet licensee commitments.
 2. For IROFS, determine if procedures are compatible with the management measures program, and prescribe adequate methods to meet the construction specifications.

03.02 Inspection Requirement 02.02

- a. Review applicant/licensee's established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements in their licensing basis, as applicable, in the area of safety-significant ventilation and confinement systems construction activities.

- b. Review audit program to verify if examinations and inspections are performed in accordance with applicant/licensee's requirements and if test personnel associated with performing tests and inspections of safety-significant ventilation and confinement systems construction activities are qualified and/or certified to perform their assigned work.
- c. Verify records establish that required audits, as applicable, were performed and that deficiencies identified during audits were tracked and corrected.

03.03 Inspection Requirement 02.03

- a. Select a sample of electrical systems and components for inspection. Inspection should be accomplished by observation and evaluations of both in-process and completed work if possible. Sample selection should be based on importance to operational safety.

Choose a sampling of safety-significant electrical components and systems. The sampling may include a variety of locations, uses and types (e.g., large motors, diesel generators, motor-operated valves, solenoid valves, control centers, control room panels and cabinets, local panels and cabinets, coaxial and triaxial connectors, fiber optic connectors, and stress-cone terminations).

- b. Ascertain whether the following applicable safety-significant ventilation and confinement system activities, as required by licensing commitments and applicable construction codes, are being controlled and accomplished in accordance with the requirements of the documents reviewed in Inspection Requirement 02.01, above:

1. Receipt Inspection. Review a sample of receipt inspection reports for major components of ventilation and confinement systems and verify receipt-inspection requirements have been implemented. The inspectors should select a sample of procurement documents regarding: (specifications and drawings, various components such as high efficiency particulate air (HEPA) filters, prefilters, and spark arrestors). Verify that these documents specify the shape, size, dimension, and material type and grade, and the Certificate of Conformance certifies the components meets the construction, material, test, and qualification requirements.
2. Storage and Handling. Review a sample of receipt reports for HEPA filter system procurement and other types of HVAC system material (e.g., scrubbers, fans, dampers, weld filler metal, fasteners, and expansion anchors). Verify conformance with storage administrative controls and technical requirements. The inspectors should ensure storage and warehousing procedures for ventilation and confinement system components, and/or the procurement documents reviewed require the following:
 - (a) Access is controlled to the storage area to maintain the quality of the materials received.
 - (b) An adequate marking system is used to maintain the identity of material in storage.
 - (c) Material is protected from the environment and weather, as appropriate. Structural steel for supports is protected from corrosion.

- (d) Nonconforming material is segregated.
 - (e) Motors, dampers, and heaters are checked to ensure wrappings are not disturbed and items are not removed from storage without proper authority.
 - (f) HEPA filters and adsorbers are stored in their original cartons in an environmentally controlled room.
3. Fit-up and Alignment. Inspect a sample of bolted connections and verify the following:
- (a) The bolted connections conform to procedure- or drawing-established tolerances for mutual parallelism and axial alignment.
 - (b) Layout instruments are calibrated. Equipment and instruments used for in-process monitoring and inspection should be calibrated to standards traceable to industry-recognized criteria. Calibration and control measures are not applicable for rulers, tape measures, levels, and other such coarse-measurement devices that provide accuracy, as received from the manufacturer.
 - (c) Inspect a sample of flanges and supports that are ready for welding and verify that the flange faces and edges conform to procedure/specification requirements.
 - (d) Inspect a sample of anchor bolts, embedded weldments, and plate anchors installations and verify the installations conform to established procedure requirements.
 - (e) Inspect a sample of bolted connections and verify that the installations and inspection activities conform to established requirements. Verify that torque wrenches used for these bolted connections had been calibrated as required by the construction specification.
4. Installation Activities. If work is in progress at the time of the inspection, witness a sample of the installation activities of safety-significant ventilation and confinement systems, to verify the following, as applicable: the latest issue (revision) of applicable drawings or procedures is available to the installers and is being used; and modifications to supports are approved by appropriate personnel before implementation.
- (a) If work is in progress at the time of the inspection, witness a sample of the installation and testing (if required) of concrete anchor bolts, to verify that anchor-bolt type, diameter, embedment length, shoulder-to-cone measurement, and torque requirements (where applicable), meet installation requirements.
 - (b) Determine whether required inspection activities are in-process and observe a sample for adequacy. In particular, determine whether construction quality control inspection of welder qualification procedures and welding of supports is conducted, if required.
 - (c) Inspect a sample of welded connections in an HVAC system and verify they conform to established requirements for weld identification, use of appropriate welding procedure(s), and control of welding materials, etc.

5. As-Built Equipment. Observe a sample of the completed installation of the following equipment for proper location, configuration, identification, and damage. The basis for this determination should be the licensing bases documents, piping and instrumentation diagrams, specifications, and installation drawings. Select from the list below, as applicable:

- (a) seismic support for ductwork;
- (b) ductwork;
- (c) isolation dampers;
- (d) recirculation test loops around fans and isolation dampers;
- (e) radiation, smoke, and toxic chemical monitor;
- (f) pressure-drop instrumentation across filter banks;
- (g) instrumentation for the detection of excess ambient temperature;
- (h) fresh air intake elevation from grade level;
- (i) fans and motors;
- (j) air handling units;
- (k) exhaust vents; and
- (l) filters.

6. Configuration Management. For the activities observed during Inspection Requirement 02.03., verify if changes occurred during these construction activities, the applicant/licensee properly controlled and documented these changes for engineering review, approval, and subsequent incorporation into the final as-built drawings, as applicable. Verify these actions were completed in accordance with their procedures and management measures, as applicable.

03.04 Inspection Requirement 02.04

Ascertain whether for the safety-significant ventilation and confinement systems construction activities, the applicant/licensee/contractor system for documenting safety-significant work is functioning in accordance with requirements.

- a. Receipt Inspection and Material Certification. Select records applicable to the receipt of lots or shipments. Select records applicable to the storage, and storage inspection of lots or groups of ventilation and confinement systems and associated items.
- 1. Records confirm that required material characteristics, performance tests, nondestructive tests, environmental qualification tests, and other specification requirements are met.
 - 2. Receipt inspection and storage records indicate that, where appropriate, defective or incorrect components, parts, and materials are controlled and prevented from installation and possible use.
 - 3. Documentation has been prepared and maintained as required by receipt inspection and documentation storage instructions.
- b. Installation Inspection.
- 1. Records confirm that specified materials and components were installed as specified and that the required construction inspections were performed, and acceptance criteria are defined.

2. Review licensee and contractor requirements covering the span of records for ventilation and confinement systems. Determine the initiation point for those records sampled and, importantly, the effectiveness of those responsible for reviewing the records for accuracy and completeness and ensuring that the recorded information meets documentation requirements. To determine the effectiveness of the licensee or contractor system for documenting work in this area, verify that:
 - (a) Type and classification of pipe support or restraint comply with appropriate drawings and specifications.
 - (b) Location, spacing, and critical clearances meet licensee's specifications and have been verified by construction quality control inspections.
 - (c) The required scope of licensee construction quality control inspections was met.
 3. Review and evaluate pertinent quality records in a sampling of the areas listed below. Determine whether:
 - (a) Adequate preparation, control, review, and evaluation of these records have been made.
 - (b) Records reflect that appropriate requirements have been met.
 - (c) The system of records is functioning properly.
- c. Nonconformance/Deviation Record(s).
1. Records include current status of these items. Nonconformance reports include the status of corrective action or resolution (e.g., determine whether adequate corrective action is being taken when test results are not within tolerance or acceptance criteria).
 2. For the inspection, review and evaluate a sampling of reports applicable to nonconformances or deviations. Determine whether:
 - (a) Records are complete and promptly reviewed by qualified personnel.
 - (b) Records have been routinely processed, evaluated in a timely manner and controlled through established channels, for resolution of the root-cause as well as the immediate problem.
 - (c) Records are properly identified and stored, indicate current status, and can be retrieved in a reasonable time.
 - (d) Nonconformance reports include the status of corrective action or resolution, and adequate justification is provided for use-as-is disposition.
- d. Training/Qualification Records of Craft, and Quality Inspection Personnel. Records establish that quality inspection personnel, as applicable, are adequately qualified for their assigned duties and responsibilities and that craft personnel have been trained in their assigned tasks. Records are complete and current and show which activities inspectors are qualified to perform.

- e. Configuration Management Records. Review and evaluate a selected sample of configuration management records, and determine whether:
 - 1. Records associated with design and field changes, as well as related work and IP changes, reflect that timely review and evaluation of design and field change documents have been performed by personnel who are qualified.
 - 2. Records of periodic inspections ensure that only the most recent approved documents, including design changes, were used in the field.
 - 3. Design changes are subject to adequate design control, including consideration of the impact of the change on the overall design and on as-built records.
 - 4. Records of nonconformance's to design requirements include preparation of a nonconformance report even if the nonconformance is resolved through the design-change process.

03.05 Additional Guidance

Note: Personnel Interviews. Informal interviews with field-craft and inspection personnel may be randomly conducted to determine how well employees know the requirements of their work activity. Ascertain whether a sufficient number of adequately qualified quality control inspection personnel, if required, are at the construction site, commensurate with the work in progress, and adequately performing their assigned duties through the established organizational structure.

- a. Particular attention should be given to the traceability of material and equipment, to prevent the use of incorrect or defective materials, parts and components. The inspectors should review the licensee's/contractors implementing procedures that correspond with applicable QAP requirements, codes and specifications. The inspectors should verify that the licensee has established measures for identification and control of materials, parts, and components, and for traceability to the approved design basis and to the source. The inspectors should ensure that required identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required, and that required markings are on the item.
- b. The inspectors should note markings on material and equipment and verify that the markings represent material and equipment as specified by the design drawings and specifications. In the case of fasteners, compliance with the applicable material specification (e.g., American Society for Testing and Materials or American Society of Mechanical Engineers (ASME) material and grade) should be verified by required markings on bolts and nuts and certified material test reports or certificates of conformance, as required by the applicable procurement drawings and specifications, and/or by the applicable codes and specifications. In the case of vendor-supplied equipment assemblies containing fasteners, samples should be inspected to verify compliance with approved vendor drawings and specifications and other information such as materials used for equipment-qualification tests and/or analyses. Caution should be exercised to ensure that the required markings on material and equipment, including fasteners, not only exist, but that the markings indicate the correct material and grade as specified.

88200.I-04 RESOURCE ESTIMATE

This appendix is intended to provide inspection requirements and guidance applicable to a wide variety of potential construction projects at both existing and new fuel cycle facilities (FCFs). These projects may vary greatly in scope, complexity, and potential risk to public health and safety. Recommended inspection scope and hours for a specific new FCF will be documented in the principal inspection plan (PIP) for that facility developed in accordance with Inspection Manual Chapter (IMC) 2694, "Fuel Cycle Facility Construction and Pre-Operational Readiness Review Inspection Program."

Additionally, this IP can be used to provide additional inspection guidance for plant modification inspections at existing facilities but is not required to be implemented for these projects. Use of this appendix, or sections of this appendix, for modifications at existing FCFs, would be done on a case-by-case basis, in accordance with IMC 2600, Appendix B, "NRC Core Inspection Requirements."

88200.I-05 PROCEDURE COMPLETION

This IP is complete when the applicable appendices or applicable appendix sections are completed for the facility, as determined by the PIP. Inspectors are not expected to complete every activity in the appendices of this IP. Instead, inspectors should prioritize inspection activities based on 1) importance of the activity to safety, 2) availability of the onsite activity at the time of the inspection, and 3) available inspection resources. This appendix does not need to be completed if there are no SSIS covered by this appendix at a FCF.

88200.I-06 REFERENCES

Refer to licensing basis requirements for applicable codes and standards for each fuel facility.

American National Standards Institute (ANSI)/ASME N509, "Nuclear Power Plant Air-Cleaning Units and Components"

ANSI/ASME N510, "Testing of Nuclear Air-Cleaning Systems"

ANSI N690, "Specification for the Design, Fabrication, and Erection of Safety-Related Steel Structures for Nuclear Facilities"

ANSI/American Nuclear Society 8.1, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors"

American Society for Heating Refrigeration and Air Conditioning Engineers, "Design Guide for Department of Energy Nuclear Facilities"

ASME B31.3, "Process Piping"

American Welding Society (AWS) D1.1, "Structural Welding Code"

AWS D1.3, "Structural Welding Code - Sheet Steel"

AWS D9.1, "Sheet Metal Welding Code"

References listed below may or may refer to the FCF being constructed or modified. Refer to licensing basis documents for actual facility requirements.

U.S. Nuclear Regulatory Commission, Regulatory Guide 3.12, "General Design Guide for Ventilation Systems of Plutonium Processing and Fuel Fabrication Plants"

END

List of Attachments:

1. Revision History Table

Attachment 1: Revision History for IP 88200 Appendix I

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional Non-Public Information)
	ML24227B019 05/28/25 CN 25-014	Initial issuance. Discipline specific appendix developed to provide technical inspection guidance for new construction and major modifications activities for fuel facilities with varying technologies, size, licensing requirements, etc.	N/A	N/A